

1 --61. A biomedical biocompatible biodegradable polyurethane
2 based on (i) a diisocyanate linked polyester polymer
3 component and (ii) a diol component, said polyurethane
4 having the formula -(A-B-C-B)_n , wherein A denotes said
5 polyester component, B denotes said diisocyanate moiety, C
6 denotes said diol component, n denotes the number of
7 recurring units, and wherein at least 90% of the diol
8 components, C, have the same block length.

1 62. A polyurethane according to claim 61 wherein B is a
2 1,4-butane diisocyanate component.

1 63. A polyurethane according to claim 61 where C is
2 selected from the group consisting of butanediol
3 components, hexanediol components, diethylene glycol
4 components and reaction products of the diisocyanate moiety
5 and two molecules of the diol component.

1 64. A biomedical biocompatible polyurethane according to
2 claim 61 consisting of repeating units of the following
3 formula:

4 $\{C(O)-NH-R_1-NH-C(O)-O-D-O-C(O)-NH-R_1-NH-C(O)-O-E-O\}_n$,

5 wherein R₁ is an n-butylene moiety, D is a polyester moiety,
6 E is selected from the group consisting of an ethylene
7 glycol-based moiety, an n-butylene glycol-based moiety, an
8 n-hexylene glycol-based moiety and a diethylene glycol-based
9 moiety and n indicates the number of repeating units.

1 65. A biomedical biocompatible polyurethane according to
2 claim 64, wherein E is selected from the group consisting of
3 ethylene, n-butylene, n-hexylene, -CH₂-CH₂-O- CH₂-CH₂- and

4 -XYX-, wherein X is selected from the group consisting of an
5 ethylene glycol-based moiety, an n-butylene glycol-based
6 moiety, an n-hexylene glycol-based moiety and a diethylene
7 glycol-based moiety and Y is a 1,4-butane-diisocyanate-based
8 moiety resulting from the reaction of 1,4-butane
9 diisocyanate with a diol selected from the group consisting
10 of ethylene glycol, n-butylene glycol, n-hexylene glycol and
11 diethylene glycol, with the mole ratio of
12 glycol:diisocyanate being 2:1.

1 66. A biomedical biocompatible polyurethane according to
2 claim 61, wherein the polyester component is based on a
3 polyester prepared by ring opening polymerization.

1 67. A biomedical biocompatible polyurethane based on (i) a
2 diisocyanate linked polyester polymer component and (ii) a
3 diol component, said polyurethane having the formula
4 $\{A-B-C-B\}_n$, wherein A denotes said polyester component, B
5 denotes said diisocyanate moiety, C denotes said diol
6 component, n denotes the number of recurring units, and
7 wherein at least 90% of the diol components, C, have the
8 same block length, wherein the polyester component is a
9 random copolyester component and is a copolyester component
10 having at least two of a moiety selected from the group
11 consisting of lactide, glycolide, trimethylene carbonate and
12 ϵ -caprolactone.

1 68. A biomedical biocompatible polyurethane according to
2 claim 61, wherein the polyester component is based on (i) at
3 least one carboxylic acid selected from the group consisting
4 of lactic acid and succinic acid and (ii) at least one diol
5 selected from the group consisting of ethylene glycol,
6 1,4-butanediol, 1,6-hexanediol and diethylene glycol.

1 69. A biomedical biocompatible polyurethane produced
2 according to a process comprising the steps of (i) reacting
3 the polyester with an isocyanate end-capped diol component
4 in order to form a prepolymer, the ratio of isocyanate
5 end-groups to polyester end- groups being at least 2:1, and
6 then (ii) reacting the resulting prepolymer with water.

1 70. A biomedical biocompatible polyurethane according to
2 claim 69, based on a copolyester of lactide and
3 ϵ -caprolactone containing 5 to 95% of units of lactide and 5
4 to 95% of units of ϵ -caprolactone, based on the total number
5 of monomeric units in the polymer.

1 71. A reaction product having the formula -XYX- wherein the
2 block-length is the same for at least 90% of the diol
3 components, produced according to the process comprising the
4 step of reacting a diol selected from the group consisting
5 of 1,6-hexane diol and diethyleneglycol with 1,4-butane-
6 diisocyanate wherein the mole ratio of diol:diisocyanate is
7 2:1 and wherein X is the diol-based component and Y is the
8 1,4-butane diisocyanate-based component.

1 72. A process for the preparation of a biomedical
2 biocompatible polyurethane defined according to claim 61,
3 comprising the steps of (i) reacting at least 2 moles of a
4 diisocyanate with 1 mole of a polyester to form a first
5 reaction product and (ii) reacting a diol selected from the
6 group consisting of 1,4-Butanediol, 1,6-hexane diol,
7 diethyleneglycol and the reaction product of two molecules
8 of said diol with the diisocyanate with said first reaction
9 product.

1 73. A process for the preparation of a biomedical
2 biocompatible polyurethane based on (i) a diisocyanate
3 linked polyester polymer component and (ii) a diol
4 component, said polyurethane having the formula
5 +A-B-C-B+_n , wherein A denotes said polyester component, B
6 denotes said diisocyanate moiety, C denotes said diol
7 component, n denotes the number of recurring units, and
8 wherein at least 90% of the diol components, C, have the
9 same block length, comprising the steps of (i) reacting at
10 least two moles of a diisocyanate with one mole of a diol
11 selected from the group consisting of 1,4-Butanediol,
12 1,6-hexane diol, diethyleneglycol and the reaction product
13 of two molecules of said diol with the diisocyanate to form
14 a first reaction product and (ii) reacting a polyester which
15 is a random copolymer with said first reaction product.

1 74. An implant constructed from at least one biomedical
2 biocompatible polyurethane defined according to claim 61,
3 having a porosity of 50 to 99 vol.%.

1 75. A method for reconstruction of at least one meniscal
2 lesion comprising the step of effecting an adhesive implant
3 to meniscal tissue having at least one of said lesions of a
4 meniscus-reconstructing quantity at a meniscus-
5 reconstructing rate of at least one polyurethane defined
6 according to claim 61 for a fibrocartilage induction time of
7 from 16 up to 30 weeks.

1 76. A biomedical biocompatible polyurethane having a phase
2 separated morphology, comprising (i) soft segments selected
3 from the group consisting of (a) polyester components,
4 (b) polyether components and (c) polyester-polyether
5 components and (ii) hard segments, said hard segments

6 consisting of diol components having a uniform block-length,
7 and wherein (A) the diol component and (B) at least one of
8 the polyester, the polyether or the polyester-polyether
9 components have been linked to a diisocyanate component by
10 means of reaction thereof with a diisocyanate.

1 77. A biomedical biocompatible polyurethane according to
2 claim 61, wherein the block-length is the same for at least
3 98% of the diol units.

4 78. A biomedical biocompatible polyurethane based on (i) a
5 diisocyanate linked polyester polymer component and (ii) a
6 diol component, said polyurethane having the formula
7 +A-B-C-B+_n , wherein A denotes said polyester component, B
8 denotes said diisocyanate moiety, C denotes said diol
9 component, n denotes the number of recurring units, and
wherein at least 90% of the diol components, C, have the
same block length, wherein the polyester component is based
on a random copolyester.

1 79. A biomedical biocompatible polyurethane based on (i) a
2 diisocyanate linked polyester polymer component and (ii) a
3 diol component, said polyurethane having the formula
4 +A-B-C-B+_n , wherein A denotes said polyester component, B
5 denotes said diisocyanate moiety, C denotes said diol
6 component, n denotes the number of recurring units, and
7 wherein at least 90% of the diol components, C, have the
8 same block length, comprising from 40 up to 60% of units of
9 lactide, based on the total number of monomeric units in the
10 polymer.

1 80. A biomedical biocompatible polyurethane based on (i) a
2 diisocyanate linked polyester polymer component and (ii) a

3 diol component, said polyurethane having the formula
4 -(A-B-C-B)_n , wherein A denotes said polyester component, B
5 denotes said diisocyanate moiety, C denotes said diol
6 component, n denotes the number of recurring units, and
7 wherein at least 90% of the diol components, C, have the
8 same block length, comprising from 40 up to 60% of units of
9 ϵ -caprolactone, based on the total number of monomeric units
10 in the polymer.

1 81. A biomedical biocompatible polyurethane according to
2 claim 76, wherein the diisocyanate is an aliphatic
3 diisocyanate.

1 82. A biomedical biocompatible polyurethane according to
2 claim 81 wherein the diisocyanate-linked polyester component
3 is a 1,4 butane diisocyanate-linked polyester component.

1 83. A reaction product having a formula selected from the
2 group consisting of YXY and YXYXY and wherein the block
3 length is the same for at least 90% of the diol components
4 produced according to a process comprising the steps of
5 reacting a diol selected from the group consisting of 1,4
6 butanediol, 1,6 hexanediol, diethylene glycol and ethylene
7 glycol with 1,4-butane diisocyanate wherein X is the diol-
8 based component and Y is the 1,4-butane diisocyanate-based
9 component.

1 84. A process for preparing a urethane polymer according to
2 claim 81 comprising the steps of:

- 3 i. admixing equimolar quantities of L-lactide and
4 ϵ -caprolactone in the presence of a stannous octoate
5 catalyst and a butanediol initiator thereby forming a
6 L-lactide- ϵ -caprolactone prepolymer;

- 7 ii. admixing butanediol with a six-fold excess of butane
8 diisocyanate thereby forming an isocyanate-terminated
9 urethane block;
- 10 iii. dissolving the L-lactide- ε-caprolactone prepolymer in
11 dimethyl sulfoxide to form a first solution;
- 12 iv. dissolving the isocyanate-terminated block in dimethyl
13 sulfoxide to form a second solution;
- 14 v. admixing the first solution with the second solution
15 to form a polyurethane reaction mass;
- 16 vi. recovering the resulting urethane polymer from the
17 reaction mass.

1 85. A process for preparing a urethane polymer according to
2 claim 61 comprising the steps of:

- 3 i. admixing equimolar quantities of L-lactide and
4 ε-caprolactone in the presence of a stannous octoate
5 catalyst and a butanediol initiator thereby forming a
6 L-lactide- ε-caprolactone prepolymer;
- 7 ii. admixing butane diisocyanate with a six-fold excess of
8 butanediol thereby forming an hydroxyl-terminated
9 urethane block;
- 10 iii. dissolving the L-lactide- ε-caprolactone prepolymer in
11 dimethyl sulfoxide to form a first solution;
- 12 iv. dissolving the hydroxyl-terminated block in dimethyl
13 sulfoxide to form a second solution;
- 14 v. admixing the first solution with the second solution
15 to form a polyurethane reaction mass;
- 16 vi. recovering the resulting urethane polymer from the
17 reaction mass. --.